NASA Procedural Requirements

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Subject: Risk Classification for NASA Payloads (Revalidated July 9, 2008)

Responsible Office: Office of Safety and Mission Assurance

Appendix A - Classification Considerations for NASA Class A-D Payloads

Four risk levels or classifications have been characterized in Appendix A. The classification considerations in this appendix provide a structured approach for defining a hierarchy of risk combinations for NASA payloads by considering such factors as criticality to the Agency Strategic Plan, national significance, availability of alternative research opportunities or reflight opportunities, success criteria, magnitude of investment, and other relevant factors. Additional or alternate classification considerations may be applied to a specific payload or payload element. The importance weighting assigned to each consideration is at the discretion of the responsible Mission Directorate.

Characterization	Class A	Class B	Class C	Class D
Priority (Criticality to Agency Strategic Plan) and Acceptable Risk Level	High priority, very low (minimized) risk	High priority, low risk	Medium priority, medium risk	Low priority, high risk
National significance	Very high	High	Medium	Low to medium
Complexity	Very high to high	High to medium	Medium to low	Medium to low
Mission Lifetime (Primary Baseline Mission	Long, >5years	Medium, 2-5 years	Short,	Short < 2 years
Cost	High	High to medium	Medium to low	Low
Launch Constraints	Critical	Medium	Few	Few to none
In-Flight Maintenance	N/A	Not feasible or difficult	Maybe feasible	May be feasible and planned

Alternative Research Opportunities or Re-flight Opportunities	No alternative or re-flight opportunities	Few or no alternative or re-flight opportunities	Some or few alternative or re-flight opportunities	Significant alternative or re-flight opportunities
Achievement of Mission Success Criteria	All practical measures are taken to achieve minimum risk to mission success. The highest assurance standards are used.	Stringent assurance standards with only minor compromises in application to maintain a low risk to mission success.	Medium risk of not achieving mission success may be acceptable. Reduced assurance standards are permitted.	Medium or significant risk of not achieving mission success is permitted. Minimal assurance standards are permitted.
Examples	HST, Cassini, JIMO, JWST	MER, MRO, Discovery payloads, ISS Facility Class Payloads, Attached ISS payloads	ESSP, Explorer Payloads, MIDEX, ISS complex subrack payloads	SPARTAN, GAS Can, technology demonstrators, simple ISS, express middeck and subrack payloads, SMEX

NOTES:

1. Mission impact; i.e., loss of function effect on other payloads or ISS operations may also be a characterization factor. For example, loss of the function of freezers and centrifuges may impact other payloads and increase the overall level of risk.

2. The safety risk to crew inherent in the operation of a human-crewed vehicle may be a factor in payload classification determinations. Class C and D payloads that have a medium or high risk of not achieving mission success may be considered unsuitable for launch on a crewed vehicle, unless they are secondary payloads making use of available launch capacity that would otherwise go unused.

3. Other situation-dependent payload classification considerations may include human-rating environment, logistics support, and interoperability interfaces.

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